

What is claimed is:

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1. A packet switching apparatus comprising:
a plurality of lower layer processing units
which are connected to physical output ports, and each
of which carries out a process for a data link layer
5 and a physical layer to a packet;

a table storing flow data including a routing
data and a search key; and

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a processing unit which searches said flow data
from said table based on a search key of a routing
10 packet received via one of said plurality of lower
layer processing units, when said flow data for said
search key of said routing packet is registered on
said table, and selectively transfers said routing
packet to one of said plurality of lower layer
15 processing units based on said routing data of said
searched flow data.

2. A packet switching apparatus according to claim
1, further comprising a packet memory, and
wherein said processing unit stores said
received packet in said packet memory, and extracts
5 said search key from said stored packet.

3. A packet switching apparatus according to claim
1, further comprising a processor carrying out a
routing process of said routing packet in response to

a routing process request to output said routing data,

5 and

wherein said processing unit generates said routing process request to said processor, when said flow data for said search key of said routing packet is not registered on said table, and registers said
10 routing data as a part of said flow data for said search key on said table such that said flow data is fully registered, when said routing data is outputted from said processor.

4. A packet switching apparatus according to claim 3, wherein said processing unit stores said search key of said routing packet in said table, when said flow data for said search key of said routing packet is not
5 registered on said table.

5. A packet switching apparatus according to claim 1, wherein said routing data includes a port number specifying a physical output port, and

wherein said processing unit selects one of
5 said plurality of lower layer processing units based on said port number of said routing data of said flow data for said search key of said routing packet, and transfers said routing packet to said selected lower layer processing section.

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6. A packet switching apparatus according to claim 1, wherein said routing data includes a port number specifying a physical output port, and

wherein said packet switching apparatus further
5 comprises a switch fabric connecting between said processing unit and said plurality of lower layer processing units, having an arbitration function and addressing said routing packet to said lower layer processing unit based on said port number.

7. A packet switching apparatus comprising:

a plurality of lower layer processing units which are connected to physical output ports, and each of which carries out a process for a data link layer
5 and a physical layer to a packet;

a security unit carrying out encrypting and decrypting processes to a first packet based on a specific security data in response to encrypt and decrypt instructions to produce a second packet,
10 respectively;

a table storing flow data including a search key, routing data and security data; and

a processing unit which searches a flow data from said table based on a search key of a routing
15 packet received via one of said plurality of lower layer processing units in said packet memory, when said flow data for said search key of said routing

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8. A packet switching apparatus according to claim 7, wherein said processing unit generates one of said encrypt and decrypt instructions based on said destination address, when said flow data for said search key of said routing packet is registered on said table and said flow data includes said security data.

9. A packet switching apparatus according to claim 7, wherein when said flow data for said search key of said routing packet received via said lower layer processing unit is registered on said table and said flow data does not includes said security data, said

processing unit handles said received routing packet as said second packet to search another flow data from said table based on a search key of said second packet.

10. A packet switching apparatus according to claim 7, further comprising a processor carrying out a security process for said routing packet in response to a security process request to output said security data for said routing packet, and

wherein said processing unit selectively generates said security process request to said processor based on said destination address, when said flow data for said search key of said routing packet is not registered on said table, and registers said security data as a part of said flow data for said search key of said routing packet on said table such that said flow data is fully registered, when said security data is outputted from said processor.

11. A packet switching apparatus according to claim 10, wherein said processing unit stores said search key of said routing packet in said table, when said flow data for said search key of said routing packet is not registered on said table.

12. A packet switching apparatus according to claim 7, further comprising a processor carrying out a

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routing process of said routing packet in response to
a routing process request to output said routing data,
5 and

wherein said processing unit generates said
routing process request to said processor, when said
flow data for said search key of said routing packet
is not registered on said table, and registers said
10 routing data as a part of said flow data for said
search key on said table such that said flow data is
fully registered, when said routing data is outputted
from said processor.

13. A packet switching apparatus according to claim
12, wherein said processing unit stores said search
key of said routing packet in said table, when said
flow data for said search key of said routing packet
5 is not registered on said table.

14. A packet switching apparatus according to claim
7, wherein said routing data includes a port number
specifying a physical output port, and

wherein said processing unit selects one of
5 said plurality of lower layer processing units based
on said port number of said routing data of said flow
data for said search key of said routing packet, and
transfers said second packet said selected lower layer
processing section.

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15. A packet switching apparatus according to claim 7, wherein said routing data includes a port number specifying a physical output port, and

wherein said packet switching apparatus further
5 comprises a switch fabric connecting between said processing unit, said security unit and said plurality of lower layer processing units, having an arbitration function and addressing said second packet to said lower layer processing unit based on said port number.

16. A packet switching apparatus comprising:

a plurality of lower layer processing units which are connected to physical output ports, and each of which carries out a process for a data link layer
5 and a physical layer to a packet;

a security unit carrying out encrypting and decrypting processes to a first packet based on a specific security data in response to encrypt and decrypt instructions to produce a second packet,
10 respectively, and selectively transfers said second packet to one of said plurality of lower layer processing units based on said routing data;

a table storing flow data including a search key, routing data and security data; and

15 a processing unit which searches a flow data from said table based on a search key of a routing packet received via one of said plurality of lower

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21. A packet switching apparatus according to claim 19, wherein when said flow data for said search key of said routing packet is not registered on said table,

5 said processing unit outputs said routing data and
said security data as said specific security data from
said processor, said routing packet as said first
packet, and one of said encrypt and decrypt
instructions to said security unit.

22. A packet switching apparatus according to claim
16, wherein said routing data includes a port number
specifying a physical output port, and

5 wherein said security unit selects one of said
plurality of lower layer processing units based on
said port number of said routing data of said flow
data for said search key of said routing packet, and
transfers said transmission packet said selected lower
layer processing section.

23. A packet switching apparatus according to claim
16, wherein said routing data includes a port number
specifying a physical output port, and

5 wherein said packet switching apparatus further
comprises a switch fabric connecting between said
processing unit, said security unit and said plurality
of lower layer processing units, having an arbitration
function and addressing said second packet to said
lower layer processing unit based on said port number.

24. A method of switching a routing packet

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5 including said search key, routing data and security
data, and said search key including a destination
address;

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selectively generating one of said encrypt and
decrypt instructions based on said destination
10 address;

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carrying out one of an encrypting process or a
decrypting processes to said routing packet based on
said security data in response to said generated
instruction, when said flow data for said search key
15 of said routing packet is registered on said table and
said flow data includes said security data, to produce
another routing packet;

outputting said another routing packet as a transmission packet to a physical output port.

27. A method according to claim 26, further comprising:

outputting said transmission packet to a
physical output port based on said searched routing
5 data.

28. A method according to claim 26, further comprising:

searching said table for a flow data based on a
search key of said transmission packet; and
5 transferring said transmission packet to a

physical output port determined based on a destination address of said transmission packet when said flow data for said search key of said routing packet is registered on said table.

29. A method according to claim 26, further comprising:

when said flow data for said search key of said routing packet is registered on said table and said flow data does not includes said security data, selectively transferring said transmission packet to said physical output port based on said routing data of said searched flow data.

30. A method according to claim 26, further comprising:

generating a process request, when said flow data for said search key of said routing packet is not registered on said table;

carrying out a routing process of said routing packet in response to said process request to output said routing data;

selectively carrying out a security process for said routing packet based on said destination address of said routing packet in response to said process request to output said security data for said routing packet; and

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registering said routing data and said security
15 data as a part of said flow data for said search key
of said routing packet such that said flow data is
fully registered.

31. A method according to claim 30, wherein said
registering includes:

registering said search key of said routing
packet in said table, when said flow data for said
5 search key of said routing packet is not registered on
said table.

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